4.3.5.4.6 *Biological Resources*

Construction of the evolutionary LWR would require 284 ha (700 acres) of land for two units large or small, and 142 ha (350 acres) for one unit large or small at each of the DOE sites analyzed. This includes areas on which plant facilities would be constructed, as well as areas used for construction laydown. Consultation with USFWS and State agencies would be conducted at the site-specific level, as appropriate to avoid potential impacts to threatened and endangered species, and other protected species and habitat.

Hanford Site

It is assumed that either the large or small evolutionary LWR would be located near the WNP-1 and WNP-2 sites. Impacts to terrestrial resources, wetlands, aquatic resources, and threatened and endangered species are discussed below.

Terrestrial Resources. Use of the existing WNP-1 site for either the large or small evolutionary LWR would result in some impact to terrestrial resources at Hanford. Less mobile animals, such as reptiles and small mammals, would not be expected to survive while more mobile animals, such as larger mammals and birds, could move from the area. The survival of the latter group of animals would depend on the carrying capacity of surrounding areas. Nests and young animals living within disturbed areas may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction.

The operation of cooling towers associated with either the large or small evolutionary LWR would create salt drifts that could, if deposited at a high enough rate, affect plants growing in the vicinity of the towers. Previous studies of a tritium production LWR at the WNP-1 site predicted that up to about 13 ha (32 acres) could be affected by deposition rates of 17.1 kg/ha (15.2 lb/acre) per month (DOE 1992e:5-55). This is the rate at which salt stress symptoms can become visible in sensitive plant species. Salt drift impacts which may be associated with either evolutionary LWR option will be evaluated in site-specific NEPA documentation.

Wetlands. Impacts to wetlands from either the large or small evolutionary LWR would not be expected since the WNP-1 site is not located near wetlands and the intake and discharge lines for this facility are already built.

Aquatic Resources. Although no aquatic habitat occurs on the WNP-1 site, past studies of a tritium production LWR at the site suggest the operation of the water intake and discharge structures could impact aquatic organisms and habitats associated with the Columbia River (DOE 1992e:5-58). Impacts from the small evolutionary LWR would be less than for the large reactor since water requirements are lower. Removal of cooling water from the river would cause the entrainment and subsequent mortality of planktonic organisms, including the eggs and larvae of certain fish species. Fish species in the Hanford Reach of the Columbia River that have planktonic egg and larval stages, and thus would be most affected by entrainment, include minnows, suckers, and mountain white fish. Eggs and fry of salmonid species are less likely to be entrained because they are not planktonic. It is not expected that free swimming salmon fry would be entrained because they typically occupy shallow, gravel areas near the stream bank away from the intake structure, which would be located away from the shore. Because a relatively small percentage of the total water volume passing the site would enter the intake, entrainment losses would not be expected to affect the viability of any populations of aquatic organisms in the Hanford Reach.

Larger fish in the immediate vicinity of the intake structure could be impinged and killed on the water intake screens. Past experience indicates that operation of the WNP-2 reactor at Hanford has resulted in only minimal loss of fish from impingement (DOE 1992e:5-58).

An additional potential source of impact to aquatic resources is the discharge of cooling tower blowdown to the Columbia River. Impacts to aquatic organisms from this source would likely be limited since thermal limits would be established as part of the NPDES permit and because heat (and chemicals) would be readily dissipated

as the discharge plume mixed with river water. Past studies associated with the WNP-2 Plant have indicated that temperatures were within 0.7 °C (1.9 °F) of the ambient river temperature at all monitoring stations downstream of the outfall. It would be expected that relatively immobile organisms, such as benthic macroinvertebrates, would be most affected. Studies of Chinook salmon and steelhead trout migrating past Hanford reactor discharge outfalls suggest that thermal discharges to the Columbia River would not affect fish. These studies have demonstrated that (1) the spawning run was unaffected by either on-shore or mid-river thermal discharges, (2) migration was unaffected when fish encountered warmer waters, and (3) salmonids were able to avoid areas with adverse temperatures and continue their migratory runs (DOE 1992e:5-58,5-59). Potential impingement, entrainment, and thermal impacts will be analyzed in detail in site-specific NEPA documentation if the Hanford site is chosen for the evolutionary LWR.

Threatened and Endangered Species. It is unlikely that federally listed threatened or endangered species would be affected by construction or operation of either the large or small evolutionary LWR near the existing WNP-1 site. Most new construction would take place in previously disturbed areas for the WNP-1 site. However, if sagebrush habitat is disturbed, several State-listed and candidate species could lose breeding and foraging habitat, including the ferruginous hawk, loggerhead shrike, pygmy rabbit, sage sparrow, sage thrasher, western burrowing owl, and western sage grouse. Preactivity surveys would be completed as appropriate prior to construction to determine the existence of special status plant or animal species in the area to be disturbed. Since existing intake and discharge facilities would be used, special status species found on or near the Columbia River would not be impacted by construction activities.

During operation, water withdrawals and discharge may cause impacts to several special status species. Water withdrawal from existing intake structures could cause entrainment and impingement impacts to several State-monitored fish species. The discharge of heated effluent could cause the great Columbia River spire snail and giant Columbia River limpet to avoid the immediate area of the discharge. The potential for these impacts would be less for the small evolutionary LWR since its water requirements would be less.

Nevada Test Site

It is assumed that either the large or small evolutionary LWR would be located in the Frenchmen Flat area of NTS. Impacts to terrestrial resources, wetlands, aquatic resources, and threatened and endangered species are discussed. Impacts described below would be similar for either reactor alternative since the land area disturbed would be the same for both and each would use a dry cooling system.

Terrestrial Resources. Construction and operation of the evolutionary LWR at NTS would result in the disturbance of terrestrial habitat equaling about 0.08 percent of NTS. This includes areas on which plant facilities would be constructed as well as areas revegetated following construction. Vegetative cover within the assumed facility location, which is primarily creosote bush (Figure 3.3.6–1), would be destroyed during land clearing operations. Creosote bush communities are well represented on NTS.

Construction of the evolutionary LWR would affect animal populations. Less mobile animals, such as reptiles and small mammals, within the project area would not be expected to survive. Construction activities and noise could cause larger mammals and birds in construction and adjacent areas and would move to similar habitat nearby. If the area to which they moved was below its carrying capacity, these animals would be expected to survive. However, if the area was already supporting the maximum number of individuals, the additional animals would compete for limited resources which could lead to habitat degradation and eventual loss of the excess population. Nests and young animals living within the assumed site may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction. Areas disturbed by construction but not occupied by facility structures would be of minimal value to wildlife because of the difficulty in establishing vegetative cover in a desert environment.

Activities associated with operation, such as noise and human presence, could affect wildlife living immediately adjacent to the facility. These disturbances may cause some species to move from the area. Disturbance to wildlife living adjacent to the facility would be minimized by preventing workers from entering undisturbed areas. Impacts to vegetation from salt drift would not occur since a closed cycle cooling system would be used.

Wetlands. Construction and operation of the evolutionary LWR would not affect wetlands because there are no wetlands near the assumed facility location.

Aquatic Resources. Construction and operation of the evolutionary LWR would not affect aquatic resources because there are no permanent surface water bodies near the assumed facility location. Temporary aquatic habitat may develop in evaporation and retention ponds, as well as in natural channels in the immediate vicinity of NPDES-permitted outfalls.

Threatened and Endangered Species. The threatened desert tortoise is a federally listed species that could be affected by construction of the evolutionary LWR at NTS. Construction activities such as land clearing operations, trenches, and excavation could pose a threat to any tortoises residing within the disturbed area. An increase in vehicle traffic is an additional hazard to the tortoise. Measures designed to avoid impacts to the desert tortoise from previous projects at NTS have been implemented as a result of a Biological Opinion issued by the USFWS (NT DOI 1992b:8-15). Recommended mitigation measures included providing worker training; putting restrictions on vehicle speeds and off-road movement; conducting clearance surveys prior to surface disturbance; approving stop work authority if tortoises are found within work areas; removing tortoises from roadways and work area; placing permanent and temporary tortoise-proof fencing around trenches, landfills, and treatment ponds; inspecting trenches; and having biologists survey when heavy equipment is in use. The USFWS would be consulted, and USFWS recommendations would be implemented if NTS were selected as the location for the evolutionary LWR.

[Text deleted.] Any listed plant species (Table 3.3.6–1) located within the construction area would be lost during land-clearing activities. Preactivity surveys would be completed as appropriate prior to construction to determine the existence of these species in the area to be disturbed.

During facility operation, vehicle traffic would pose a hazard to the desert tortoise similar to the hazard caused by current traffic. Extensive measures, including personnel training, are presently being taken to ensure that drivers on NTS avoid the tortoise. [Text deleted.] Groundwater levels in Devils Hole cavern are not expected to change due to operation of the evolutionary LWR (Section 4.3.5.4.4); therefore, impacts to the Devils Hole pupfish are not expected. Similarly, other rare endemic aquatic species found in the Ash Meadows area would not be affected.

Idaho National Engineering Laboratory

It is assumed that either the large or small evolutionary LWR would be located in the south central part of INEL, 3.2 km (2 mi) northeast of the ICPP. Impacts to terrestrial resources, wetlands, aquatic resources, and threatened and endangered species are discussed. Impacts described below would be similar for either reactor alternative since the land would be the same for both and each would use a dry cooling system.

Terrestrial Resources. Construction and operation of the evolutionary LWR would result in the disturbance of terrestrial habitat equaling about 0.1 percent of INEL. Vegetation within the assumed site would be destroyed during land clearing operations. Big sagebrush is the dominant plant within the proposed site. Plant communities in which big sagebrush is the dominant overstory species are well represented on INEL, but are relatively uncommon regionally because of widespread conversion of shrub-steppe habitats to agriculture.

Construction of the evolutionary LWR would affect animal populations. Less mobile animals within the project area, such as reptiles and small mammals, would not be expected to survive. Construction activities and noise

would cause larger mammals and birds in the construction and adjacent areas to move to similar habitat nearby. If the area to which they moved was below its carrying capacity, these animals would be expected to survive. However, if the area was already supporting the maximum number of individuals, the additional animals would compete for limited resources which could lead to habitat degradation and eventual loss of the excess population. Because pronghorn use of the assumed site is relatively low, the facility should not have a lasting impact on these species. Nests and young animals living within the project area may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction. Areas disturbed by construction but not occupied by facility structures would be of minimal value to wildlife because they would be maintained as landscaped areas.

Activities associated with facility operations, such as noise and human presence, could affect wildlife living immediately adjacent to the evolutionary LWR. These disturbances may cause some species to move from the area. Disturbance to wildlife living adjacent to the facility would be minimized by preventing workers from entering disturbed areas. Impacts to vegetation from salt drift would not occur since dry cooling towers would be used.

Wetlands. Construction and operation of the evolutionary LWR would not affect wetlands since there are no wetlands near the assumed facility location. Wetlands associated with the Big Lost River are located 2.4 km (1.5 mi) from the site; therefore, impacts to these wetlands are not expected.

Aquatic Resources. Construction and operation of the evolutionary LWR would not impact aquatic resources since there are no surface water bodies near the assumed facility location. The nearest surface water body is in the Big Lost River which is located 2.4 km (1.5 mi) from the facility location. Temporary aquatic habitat may develop in evaporation and retention ponds, as well as in natural channels in the immediate vicinity of NPDES permitted outfalls.

Threatened and Endangered Species. It is unlikely that federally listed threatened or endangered species would be affected by construction of the evolutionary LWR, but several State-status species may be affected. [Text deleted.] Burrows and foraging habitat for the pygmy rabbit would be lost. Bat species, such as the Townsend's western big-eared bat, may roost in caves and forage throughout the proposed site. One State-listed sensitive plant species could potentially be affected by construction of the facility. The plant species, tree-like oxytheca, has been collected at eight sites on INEL and at only two other sites in Idaho (IN DOE 1984a:34,36). If present, individual plants of this species could be destroyed during land clearing activities. Preactivity surveys would be completed as appropriate prior to construction to determine the existence of these species in the area to be disturbed.

During operation of the new facility, several bat species could forage at evaporation and stormwater retention ponds. No impacts to threatened and endangered species are expected due to facility operation.

Pantex Plant

It is assumed that the potential site for the evolutionary LWR is located in the northwest portion of Pantex. Impacts to terrestrial resources, wetlands, aquatic resources, and threatened and endangered species are discussed below.

Terrestrial Resources. Construction and operation of either the large or small evolutionary LWR at Pantex would result in the disturbance of terrestrial habitat equaling about 8.0 percent of the site. Land on which the facility would be built is presently used for agricultural purposes.

Construction of either the large or small evolutionary LWR would affect animal populations. Less mobile animals within the project area, such as reptiles and small mammals, would not be expected to survive. Construction activities and noise would cause larger mammals and birds in the construction area and adjacent

areas to move to similar habitat nearby. If the area to which they moved was below its carrying capacity, these animals would be expected to survive. However, if the area was already supporting the maximum number of individuals, the additional animals would compete for limited resources which could lead to habitat degradation and eventual loss of the excess population. Nests of migratory birds and young animals living within the assumed site may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction. Areas that would be reestablished as farmland or revegetated upon completion of construction would be recolonized by animal species present in nearby, undisturbed habitats.

Activities associated with facility operation, such as noise and human presence, could affect wildlife living immediately adjacent to the facility. These disturbances may cause some species to move from the area. Disturbance to wildlife living adjacent to the facility would be minimized by preventing workers from entering undisturbed areas. Impacts to vegetation from salt drift would not occur since dry cooling towers would be used.

Wetlands. Impacts to wetlands may result from land disturbances and treated wastewater disposal during construction. Construction-related ground disturbance may increase the potential for sediment runoff to the playa wetlands. This impact would be controlled through the implementation of standard soil erosion and sediment control measures. Site playas would be avoided during construction. A small area designated as a pristine wetland on NWI maps is located in the site area. If this area is determined to be a jurisdictional wetland, any potential impacts would be mitigated according to DOE policy set forth in 10 CFR 1022 and in accordance with COE permit requirements.

During construction and operation, treated wastewater would be discharged to the playas. Although part of the discharged water would be lost to the atmosphere due to high evapotranspiration rates, it could cause shifts in the composition of wetland plant communities and increases in the area of open water. The plant community shifts would favor plants tolerant of longer and deeper inundation. Furthermore, disturbed plant communities provide an opportunity for establishment of invasive exotic plant species. The potential for these impacts would be less for a small evolutionary LWR since less water would be discharged to site playas. All wastewater discharges would be treated as necessary to meet NPDES-permit requirements.

Aquatic Resources. Construction and operation of either the large or small evolutionary LWR facility would result in discharges of wastewater to the playas. As discussed for wetlands, the discharges could potentially result in an increase in open water area which would provide some additional aquatic habitat. Playas could also be affected by sediment runoff during construction; however, this impact would be controlled through the use of soil erosion and sediment control measures.

Threatened and Endangered Species. The bald eagle is a consistently occurring federally listed species at Pantex that has the potential to be affected by construction or either the large or small evolutionary LWR. Bald eagles avoid areas where humans are active; thus, wintering eagles observed at Pantex would be disturbed by increased activity.

Several Federal candidate or State-listed species may be affected by construction activities. Similar to the bald eagle, white-faced ibis may be discouraged from foraging at site playas during construction. [Text deleted.] The swift fox would also lose potential foraging and denning habitat. During operation, the swift fox would not use areas in proximity to the operating plant. The Texas horned lizard is less mobile and would be lost during land-clearing activities. Preactivity surveys would be completed, as appropriate, prior to construction to determine the existence of these species in the area to be disturbed. Consultation with USFWS would occur as required and, if necessary, a detailed mitigation plan would be developed.

[Text deleted.]

Oak Ridge Reservation

For analytical purposes it is assumed that either the large or small evolutionary LWR would be located at the former breeder reactor site. Impacts to terrestrial resources, wetlands, aquatics resources, and threatened and endangered species are discussed below.

Terrestrial Resources. Although the assumed evolutionary LWR site is located within an area that has been designated as pine and pine hardwood forest (Figure 3.6.6–1), it was disturbed in the past by clearing and grading activities for the breeder reactor. Presently, the site could be classified as an old field. Construction of evolutionary LWR would result in this area being redisturbed. It is also possible that some undisturbed vegetation, primarily pine and pine hardwood forest, immediately surrounding the site would also be cleared.

Salt drift from wet cooling towers associated with either the large or small evolutionary LWR could cause salt deposition on surrounding land areas and vegetation. At present, the reactor design has not advanced sufficiently to predict the area that could be affected by salt drift at ORR; however, previous studies for a proposed tritium reactor at SRS, which was designed for the southeastern United States, would be expected to be applicable to ORR. The proposed SRS reactor was predicted to impact 5 ha (12 acres) at a deposition rate of 17.1 kg/ha/month (15.2 lb/acre/month) (DOE 1992e:5-213). This is the level at which salt stress symptoms could become evident on sensitive plants. Salt drift impacts which may be associated with either evolutionary LWR option will be evaluated in site-specific NEPA documentation.

Construction of the proposed facility would affect animal populations. Less mobile animals within the proposed project area, such as amphibians, reptiles, and small mammals, would not be expected to survive. Construction activities and noise would cause larger mammals and birds in the construction area and adjacent areas to move to similar habitat nearby. If the area to which they moved was below its carrying capacity, these animals would be expected to survive. However, if the area was already supporting the maximum number of individuals, the additional animals would compete for limited resources which could lead to habitat degradation and eventual loss of the excess population. Nests and young animals living within the assumed site may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction. Upon completion of construction, revegetated areas would be of minimal value to most wildlife since they would be maintained as landscaped areas.

Activities associated with facility operation, such as noise and human presence, could affect wildlife living immediately adjacent to the proposed facility. These disturbances may cause some species to move from the area. Disturbance to wildlife living adjacent to the facility would be minimized by preventing workers from entering undisturbed areas.

Wetlands. Because the majority of the land in the site area is upland, it is expected that direct impacts to wetlands from construction of either a large or small evolutionary LWR could largely be avoided. Minor impacts could occur from the construction of rights-of-way. Indirect impacts to wetlands from stormwater runoff during construction and operation are possible. Impacts on wetlands would not be expected from salt deposition due to the limited area that would likely be affected. It may be necessary to cross wetlands when constructing intake or outfall structures; however, impacts would be temporary. Any unavoidable impacts to wetlands would be mitigated according to DOE policy set forth in 10 CFR 1022 and in accordance with the COE permit requirements.

Construction-related discharges (for example, from foundation dewatering) would be directed to the Clinch River. Discharges to the Clinch River would have minimal impact on the flow of the river and would not be expected to affect associated wetlands.

During operation, blowdown water from the cooling system would also be discharged to the Clinch River. Discharges to the Clinch River, which for the large evolutionary LWR option would represent up to 20 percent

of the flow of the river during each discharge period, could lead to streambed scouring in the vicinity of the outfall and subsequent downstream sedimentation. This could alter wetlands present in the vicinity of the outfall, as well as those located downstream. The use of detention ponds and engineered energy dissipating structures would reduce impacts of discharges. Thermal impacts to wetland vegetation could occur with the release of large volumes of cooling tower blowdown. All wastewater discharges would be treated as necessary to meet NPDES-permit requirements.

Aquatic Resources. Construction of either the large or small evolutionary LWR could cause water quality changes, primarily sediment loading and resulting turbidity, to the Clinch River. These potential impacts would be reduced by implementing a soil erosion and sediment control plan. Construction water withdrawal would represent a very small percentage of the average flow of the Clinch River and, thus, would have little affect on its flow. Impingement and entrainment impacts would, therefore, be minimal and would be unlikely to affect fish populations in the Clinch River. During construction, dewatering discharges would be directed to the Clinch River. Impacts to the river would be expected to be minimal.

During operation, water withdrawals could increase entrainment and impingement of fish in the Clinch River. However, the volume of the water withdrawn for either reactor alternative would comprise a small percentage of the flow of the river and is unlikely to affect fish populations. Further, intake structures would be designed to reduce intake flow rates, thereby reducing impingement and entrainment losses.

Blowdown water from the cooling system of the evolutionary LWR would be released to the Clinch River. Discharge to the river from the large evolutionary LWR would represent about 20 percent of the flow of the river during each discharge period. This could result in streambed scouring in the vicinity of the outfall and subsequent downstream sedimentation. Although fish would likely return to the disturbed area between periods of discharge, this would not be possible for benthic organisms. Thermal impacts may also occur as the result of the release of large intermittent volumes of cooling water. Detention ponds may be necessary to reduce peak flows to the Clinch River. Chemical constituents and temperature of the discharges would be required to meet NPDES permit limits.

Threatened and Endangered Species. It is unlikely that federally listed threatened or endangered species would be affected by construction or operation of either the large or small evolutionary LWR at the former breeding reactor site on ORR. Since this site is located within previously disturbed habitat, there is less potential for impact to special status species. Any special status plant species found in the pine and pine hardwood forest habitat adjacent to the disturbed site area could be destroyed if additional land is required. Prior to development, a survey would be conducted to determine the occurrence of listed plant species. Small, relatively immobile animal species, such as the Allegheny woodrat and southeastern shrew, could be destroyed during land-clearing activities. Preactivity surveys would be conducted as appropriate prior to construction to determine the existence of these and other special status species.

Savannah River Site

It is assumed that either the large or small evolutionary LWR would be constructed just to the northeast of the N-Area. Impacts to terrestrial resources, wetlands, aquatic resources, and threatened and endangered species are discussed below.

Terrestrial Resources. Construction and operation of the evolutionary LWR at SRS would result in the disturbance of terrestrial habitat equaling about 0.4 percent of the site. Since the majority of the site is covered by pine plantations, it is this vegetation type that would be most affected. However, other upland types, such as old-field, and mixed forest and grassland could also be impacted. Bottomland hardwoods and wetlands would be avoided to the extent possible.

Salt drift from wet cooling towers associated with either the large or small evolutionary LWR could cause salt deposition on surrounding land areas and vegetation. At present, the reactor design has not advanced sufficiently to predict the area that could be affected by salt drift at SRS; however, previous studies for a proposed tritium reactor at SRS predicted that 5 ha (12 acres) would be affected at a deposition rate of 17.1 kg/ha/month (15.2 lb/acre/month) (DOE 1992e:4-126). This is the level at which salt stress symptoms could become evident on sensitive plants. Salt drift impacts which may be associated with either evolutionary LWR option will be evaluated in site-specific NEPA documentation.

Construction of an evolutionary LWR would affect animal populations. Less mobile animals, such as amphibians, reptiles, and small mammals, within the project area would not be expected to survive. Construction activities and noise would cause larger mammals and birds to move to similar habitat nearby. If the area to which they moved was below its carrying capacity, these animals would be expected to survive. However, if the area was already supporting the maximum number of individuals, the additional animals would compete for limited resources which could lead to habitat degradation and eventual loss of the excess population. Nests of migratory birds and young animals living within the assumed site may not survive. The site would be surveyed as necessary for the nests of migratory birds prior to construction. Upon completion of construction, revegetated areas would be of minimal value to most types of wildlife because they would be maintained as landscaped areas.

Activities associated with facility operations, such as noise and human presence, could affect wildlife living immediately adjacent to the facility. These disturbances may cause some species to move from the area. Disturbance to wildlife living adjacent to the facility would be minimized by preventing workers from entering undisturbed areas.

Wetlands. Since the majority of the assumed evolutionary LWR site is upland, it is expected that direct impacts to wetlands from construction of either reactor alternative could be largely avoided. Implementation of soil erosion and sediment control measures would control secondary impacts. Impacts to wetlands resulting from the construction of intake or outfall structures would be temporary. Any unavoidable impacts to wetlands would be mitigated according to DOE policy set forth in 10 CFR 1022 and in accordance with COE permit requirements. Construction wastewater discharge to Fourmile Branch would be minimal and would not be expected to affect wetlands associated with the stream.

Cooling system blowdown would be directed to either Fourmile Branch or Par Pond. Intermittent discharges of large volumes of water from cooling system blowdown to Fourmile Branch could impact wetlands bordering the stream and the Savannah River Swamp. Sediment build up in the Savannah River Swamp resulting from streambed scouring could result in swamp forest vegetation being replaced by scrub/shrub or emergent vegetation. Also, erosion of stream banks could result in the loss of wetland vegetation. These impacts would be less for the small evolutionary LWR since a smaller discharge volume is involved. The use of detention ponds and engineered energy dissipating structures would reduce impacts of discharges. Thermal impacts to wetlands were not predicted for a previous tritium reactor planned for SRS (DOE 1992e:5-215); such impacts are also not expected for the proposed reactor. All wastewater discharges would be treated as necessary to comply with NPDES-permit requirement.

As an alternative to discharging blowdown water to Fourmile Branch, water from cooling tower blowdown could be discharged to Par Pond via pre-cooling ponds (that is, Pond 2, Pond 5, and Pond C). Makeup water currently is pumped into Par Pond from the Savannah River to maintain its level and the proper rate of flow in Lower Three Runs Creek (DOE 1992e:5-216). If blowdown water from either reactor alternative were sent to Par Pond, no impacts to wetlands would be anticipated since there would be no change in the level of Par Pond or the flow rate of Lower Three Runs Creek.

Aquatic Resources. Stormwater runoff during construction of either the large or small evolutionary LWR could cause temporary water quality changes in Fourmile Branch and Pen Branch. Increased turbidity could impact

some fish spawning and feeding habitat. Fish populations would probably move to less disturbed areas of the stream and recolonize disturbed areas shortly after construction is complete and water quality improves. Construction of intake and discharge facilities would result in the temporary loss of habitat in the affected waterbodies. During construction, wastewater would be discharged to Fourmile Branch. These discharges would be minimal and would not be expected to affect aquatic resources.

During operation of either Evolutionary LWR Alternative, water would be withdrawn from the Savannah River. For both alternatives, the volume of water withdrawn represents a small percentage of the average flow of the river and would not affect its flow. However, an increase in entrainment and impingement of fish could occur. Based on previous studies for a tritium production reactor at SRS (DOE 1992e:5-218) and monitoring of past SRS operations (WSRC 1989e:4-506), fish populations should not be affected by entrainment losses from operation of the evolutionary LWR. Similarly, impingement losses should not impact fish populations. Impacts to anadromous fish (for example, striped bass and several species of shad) due to entrainment and impingement, would also be relatively low and would not affect their populations. In compliance with the *Anadromous Fish Conservation Act*, populations of anadromous fish species would be sustained and their movement unobstructed by project construction and operation.

During operation, blowdown from the cooling system of either the large or small evolutionary LWR would be released to either Fourmile Branch or Par Pond. Impacts would be less for the small evolutionary LWR since it would discharge a smaller volume of water. Intermittent discharges of large volumes of water from blowdown would greatly increase the flow rate of Fourmile Branch which would cause flooding and stream bed scouring. This could alter the aquatic ecosystem by displacing existing plant and animal communities. Previous studies for a tritium production reactor at SRS indicated that water temperatures of discharges were expected to be within the thermal tolerance limits of native warmwater fish species. The temperature of water from blowdown discharges was also expected to be within normal water temperatures of each season and were not expected to alter the distribution or abundance of aquatic organisms in receiving waters. However, the temperature of blowdown water discharged to Fourmile Branch was predicted to exceed the maximum temperature differential of 2.8 °C (7.5 °F) between effluent and receiving stream during the cooler months of the year. Such an exceedance would require a Section 316(a) demonstration of balanced biotic community (DOE 1992e:5-218, 5-219).

Discharge to Par Pond would have no flow impacts since it currently receives makeup water to maintain its level. In fact, projected discharges would reduce the need to pump makeup water to Par Pond. Thermal impacts to Par Pond would not be expected since discharged water would pass through a series of precooling ponds designed to meet the State of South Carolina requirements for thermal releases to Class B waters; however, the recovery of the precooling ponds from past thermal discharges would be affected.

Threatened and Endangered Species. The only federally listed threatened or endangered species that could be affected by construction of either the large or small evolutionary LWR at SRS is the smooth purple coneflower. Although suitable foraging habitat for the red-cockaded woodpecker exists in the area, the woodpecker colonies are located far enough from the assumed site that this species would not be directly impacted by the reactor. Other special status species that would potentially be impacted by construction activities include the green-fringed orchid, eastern tiger salamander, Florida false loosestrife, beak-rush, star-nosed mole, and Cooper's hawk. If present, individuals of each of these species could be destroyed, except the hawk which could be temporarily displaced during construction.

During operation, there is potential for impacts to the federally listed short nose sturgeon and wood stork. The short nose sturgeon has been observed in the Savannah River where cooling water would be withdrawn. However, sturgeon eggs tend to sink and are strongly adhesive and gelatinous, which limits their downstream transport and dispersal through the water column. Thus, sturgeon eggs do not have a high entrainment risk. The preference of sturgeon larva for benthic habitat and the ability of juvenile and adult sturgeon to attain swimming speeds above the water intake velocity demonstrate the unlikelihood of impingement losses of this species

(DOE 1992e:5-222). Cooling system blowdown discharged to Fourmile Branch from either reactor alternative could cause an increase in stream depth which could disrupt the foraging activities of the wood stork. Preactivity surveys would be conducted as appropriate prior to construction to determine the occurrences of these and other special status species within the construction and water discharge areas. Consultation with USFWS would occur as required and, if necessary, a detailed mitigation plan would be developed.